be for the great good of learning, and also for the special reason set forth in the following statement:—

In 1899 an International Association of Academies, composed of the leading learned bodies of many countries, was formed, the Royal Society taking an active part in its formation. Since the various studies cultivated by the constituent academies could be readily divided into two categories—(1) those of mathematical, experimental and natural science, and (2) those of philology, history and philosophy—the association established within itself two sections, one for the former the other for the latter studies, and drew up statutes in accordance with this division.

The Royal Society is, at the present time, concerned with studies of the former category only; and since no other learned body of the United Kingdom dealing with the studies of the other category belongs to the association, it has come about that while most other countries are represented in both sections, either by two academies or by an academy taking charge of studies of both categories, this country is represented in one section only.

In other words, in this country there does not exist, as in most other countries, an academy or other organisation of the rank of the several academies constituting the association in question, charged with the duty of fostering studies of the second category. The Royal Society, therefore, thought it to be its duty to bring this fact, regrettable on general grounds, quite apart from representation in the International Association of Academies, to the notice of certain persons in this country eminent in those studies.

A correspondence with these eminent persons resulted in the Royal Society being invited to consider how this regrettable state of things could be remedied, and in particular whether the Royal Society was able and willing to include the studies in question within its sphere of action.

The president and council of the Royal Society appointed a special committee to consider and report upon the matter, instructing the committee not to advise the president and council as to what action the society should take, but simply to state the reasons for and against the several suggestions put forward in the correspondence above mentioned.

The committee after prolonged investigation and consideration made a report of the desired character, stating incidentally its opinion that under the charters of the society the studies in question could, if it were deemed desirable, be taken charge of by the society itself.

The report of the committee was discussed at a special meeting of the Fellows, and the president and council, after carefully considering the report and the discussion at the above meeting of Fellows, adopted a resolution to the effect that they were of opinion that the studies in question ought to be taken care of by some academic organisation, and that this should be effected, not by the Royal Society taking charge of these studies, but by the establishment of some other body.

The president and council believe that the proposed academy, for which a petition has been presented, may with confidence be expected to take care of and promote the studies in question efficiently and successfully. They have reason to think that the establishment of an academy taking charge of such studies will be welcomed by all the constituent academies of the association, and they are prepared to offer it if established the cordial and friendly support of the Royal Society.

They therefore respectfully urge that the petition be granted.

And your petitioners will ever pray.

NOTES.

THE Croonian lecture of the Royal Society will be delivered on Thursday, March 13, by Prof. A. Gamgee, F.R.S., on the physico-chemical properties of hæmoglobin, its compounds and derivatives.

THE seventy-second annual meeting of the British Association will be held at Belfast on September 10–17, under the presidency of Prof. James Dewar, F.R.S. The presidents of the sections will be as follows:—A (mathematical and physical science), Prof. J. Purser; chairman of department for astronomy and cosmical physics, Prof. A. Schuster, F.R.S.; B (chemistry), Prof. E. Divers, F.R.S.; C (geology), Lieut.-General C. A. McMahon, F.R.S.; D (zoology), Prof. G. B. Howes, F.R.S.; E (geography), Colonel Sir T. H. Holdich, K.C.B.; F (economic science and statistics), Dr. E. Cannan; G (engineering), Prof. J. Perry, F.R.S.; H (anthropology), Prof. A. C. Haddon, F.R.S.; I (physiology), Prof. W. D. Halliburton, F.R.S.; K (botany), Prof. J. Reynolds Green, F.R.S.; L (educational science), Prof. Henry E. Armstrong, F.R.S. The evening discourse on September 12 will be delivered by Prof. J. J. Thomson, F.R.S., on "Becquerel Rays and Radio-activity"; and the discourse on September 15 will be on "Inheritance," by Prof. W. F. R. Weldon, F.R.S. The lecture to the operative classes, on September 13, will be by Prof. L. C. Miall, F.R.S, on "Gnats and Mosquitoes."

M. BAILLAUD has been elected a correspondant of the section of astronomy of the Paris Academy of Sciences in succession to the late M. Souillart.

ONE of Prof. J. C. Ewart's zebra-pony hybrids will be exhibited next week, March 13 and 14, in the Agricultural Hall, Islington.

THE Right Hon. R. W. Hanbury, M.P., President of the Board of Agriculture, has appointed a departmental committee to inquire into and report as to the present position and future prospects of forestry and the planting and management of woodlands in Great Britain, and to consider whether any measures might with advantage be taken, either by the provision of further educational facilities or otherwise, for their promotion and encouragement. The committee consists of Mr. R. C. Munro-Ferguson, M.P. (chairman), Sir John F. L. Rolleston, M.P., Mr. E. S. Howard, C.B., Prof. W. Schlich, C.I.E., Colonel F. Bailey, R.E., Prof. J. R. Campbell, Mr. J. H. Lewis, M.P., Mr. George Marshall and Dr. W. Somerville.

MR. R. H. TIDDEMAN, M.A., F.G.S., who joined the staff of the Geological Survey, under Murchison, in 1864, has just retired from the public service.

A MEETING of the Engineering Standards Committee was held at the Institution of Civil Engineers on March 4, to hear evidence on the question of the standardisation of locomotives and the specifications for the materials used in their construction. The questions down for consideration were:—(1) Is it desirable to proceed with the standardisation of locomotives? (2) If so, should this be a question of general design or only of component parts? (3) How far would it be of practical value to have standard specifications defining the quality of the materials used in locomotive construction?

ON Tuesday next, March 11, Prof. E. B. Poulton, F.R.S., will deliver the first of a course of two lectures at the Royal Institution, on "Recent Researches on Protective Resemblance, Warning Colours and Mimicry in Insects." The Friday evening discourse on March 14 will be delivered by Prof. Silvanus P. Thompson, his subject being "Magnetism in Transitu"; the succeeding discourse on March 21 will be given (in English) by Geheimrath Prof. Otto N. Witt, of Berlin, on "Recent Developments in Colouring Matters."

THE annual dinner of the Royal School of Mines was held at the Hotel Cecil on Friday last, Mr. Bedford McNeill being in the chair. In proposing "The Mining and Metallurgical Industries," the chairman alluded to the magnitude of the two industries connected with their profession, and said that mining in the past had been largely carried on by men who did not have the advantage of educational facilities, who had to learn largely, if not solely, in the school of experience. In spite of the improvement which had been effected in Cornwall, it had to be admitted that the conditions of practical mining in Cornwall were not fully representative of those higher developments which had been achieved in our colonies and in foreign countries. Mr.

W. Whitwell, in responding, spoke of the severe competition which the iron trade was experiencing in America, and attributed the success of the American iron trade in a great degree to the opportunities afforded in that country for education.

A FEW of the items in the Civil Service Estimates for the year ending March 31, 1903, are of interest in their connection with science and education. In the class of Salaries and Expenses of Civil Departments, the estimate for the Board of Agriculture, England, is 5378*l.* less than last year, but the Department of Agriculture, Ireland, has an estimate increased by 17,439*l.*, of which 4110*l.* is required for salaries and wages in connection with institutions of science and art, 300*l.* for the Royal College of Science for the purchase of books, specimens, &c., 1000*l.* for annual grants for science instruction, and 5800*l.* for grants in aid of day secondary schools. In the class of Education, Science and Art, there is a net increase of 235,446*l.*, of which extra amount the Board of Education will receive 170,884*l.*, while scientific investigation, &c., will obtain a net increase of 15,242*l.* The latter estimate includes an additional grant of 3000*l.* towards the cost of adapting and equipping Bushy House for the purpose of the National Physical Laboratory, this amount completing a total grant of 19,000*l.* There is also a grant of 16,000*l.* as the first instalment on account of a total sum of 42,000*l.* estimated to be required in a period of three years in connection with the international scheme for investigating problems connected with the fisheries of the North Sea and adjacent waters.

TO celebrate the election of M. Bouquet de la Grye to the presidency of the Paris Academy of Sciences, the Artistic Union of Auvergne has had a medal designed and struck, and it was presented to him with an album containing expressions of esteem at a banquet held on February 13. The face and back of the medal are illustrated in *La Nature*, and the views are here reproduced. Colonel Laussedat presided at the banquet and referred in appropriate terms to the numerous scientific investigations of his colleague, from his first work in hydrography and on the transit of Venus expedition to his researches on the influence of the moon and his great scheme for making Paris a seaport. In reply, M. Bouquet de la Grye expressed himself conscious of the honour done him by the Academy of Sciences, and gratified at the celebration of it by his friends.

THE three very interesting papers on electric shocks which were read before the Institution of Electrical Engineers last Thursday direct attention to a subject of which very little seems to be known from either the electrical or the physiological side. Mr. Aspinall quoted a number of cases in which death might have been expected, but did not occur, and formulated a list of pertinent questions to which definite and certain answers would be of the highest value. Mr. Trotter gave a practical demonstration that the liability to shock at 500 volts is very much less than is generally believed. With dry boots and clothes he showed that one could quite safely stand or lie on an earthed rail whilst handling a live conductor at 500 volts. In other words, it is quite safe to fall across the rails of, say, the Central London Railway provided bare skin does not touch *both* the earthed and the live rail. Unfortunately, in a case of accident one cannot arrange the conditions for safety, and, moreover, a sudden unexpected shock may have much worse effects than one taken carefully and deliberately. The discussion of the papers on March 13 is likely to be of great interest. What is, perhaps, most desirable is that some definite information should be forthcoming on how best to restore life in a case of apparent death from electric shock.

AN interesting account of the electrical manufacture of carbon bisulphide is given in a recent number of the New York *Electrical Review*. The furnaces consist of tall stacks which are filled with charcoal; sulphur is fed in at the bottom of the furnace and allowed to rise, when molten, as high up the electrodes as is considered advisable. The molten sulphur acting as an insulator, the height to which it rises serves to regulate the current. Carbon bisulphide vapour is led off at the top of the furnace. The plant consists of two furnaces, each having a capacity of 20,000 pounds per day. One furnace lies idle, for cleaning, &c., whilst the other is running; it is said that a furnace can be run continuously for several months. The power is derived from alternators direct-coupled to water wheels, and at present only half the available water-head is being utilised. The larger output obtainable when the full water-head is used is likely to be considerably in excess of the demand.

Medal presented to M. Bouquet de la Grye.

WE have received an attractive pamphlet from the Acheson Graphite Company (Niagara Falls), which contains some useful information and data relating to the electrodes which they manufacture. The electrodes are first made up in amorphous carbon, which is then converted to graphite by baking at a very high temperature in the electric furnace. It is claimed that the conversion to graphite is complete. These electrodes are especially suitable for electrolytic purposes on account of their high conductivity and low porosity, and also, a recommendation which will appeal to experimentalists, on account of the ease with which they can be machined and worked. It is also not unlikely that the use of graphite electrodes in metallurgical processes will extend. Both in metallurgical and electrochemical work the quality of the electrodes is of the first importance, making in many instances all the difference between success and failure.

DR. C. JENSEN, of Hamburg, has contributed to the *Meteorologische Zeitschrift* for December last an interesting paper on the subject of atmospheric polarisation. The author reviews all the principal theories and discoveries from those of Arago in 1809 to the recent important works of Dr. Pernter relating to the analogy of various turbid media with the blue light of the sky. The author considers that the observation of atmospheric polarisation should be of use in weather prediction, as showing approaching cloudiness some hours before it is visible by other means, and also as showing whether the sky is clear or otherwise above a stratum of fog.

THE "campylograph" invented by Père Marc Dechevrens for mechanically describing certain ornamental curves is the subject of a paper by its inventor in *Cosmos* for February 22, and of a pamphlet, published in Brussels, by Père Potron, who deals with the equations of the curves it describes. The machine, to which the name campylograph is given, is an arrangement for compounding the projections, in two mutually perpendicular directions, of two circular motions, and as such it can be made to trace Lissajou's curves exactly, the amplitude of the component vibrations remaining constant instead of decaying as is the case with compound pendulums. Moreover, the table carrying the paper can be rotated and a variety of figures thus obtained, including the epicycloids and hypocycloids, and also curves similar to those given by a harmonograph with clockwork table, but without the gradual decrease in amplitude. It should, however, be remembered that numerous machines have at different times been designed for drawing various classes of ornamental curves, and it seems as likely as not that something practically identical with the "campylograph" may have been previously constructed.

SEVERAL papers tending to raise doubts regarding the well-known laws of electromagnetism for bodies in motion have already been noticed in these columns. M. R. Blondlot writes on this matter in the *Journal de Physique* for January. If a current of air is moving parallel to the axis of z in a magnetic field the lines of force of which are parallel to the axis of x, then, according to Hertz and Lorentz, an electromotive force ought to be set up in the negative direction of the axis of y, and if the two plates of a condenser are placed perpendicularly to this direction and connected by a wire so as to bring them to the same potential, they ought to become charged and to remain charged when they are separated. According to M. Blondlot, however, the only observable effects are such as can be accounted for by accidental causes, and are small in comparison with those required by theory. The author further remarks that by an application of the principle of action and reaction it would appear to follow that a displacement current in air exerts no magnetic action, and according to this view the discharge of a condenser is magnetically an open current. Or if this contradiction of Maxwell's theory be not admitted, we should have to abandon the principle of reaction.

THE spark spectra of those elements which are gaseous at ordinary temperatures have been extensively investigated, but little research has been hitherto done on the arc spectra of gases. Mr. O. H. Basquin has recently published, in the *Proceedings* of the American Academy of Arts and Sciences (vol. xxxvii pp. 161–174), an account of his research on "The Arc Spectrum of Hydrogen." In his apparatus, one electrode was made to rotate quickly, this preventing the welding together of the electrodes and also throwing the hot gases to one side. That part of the flame of the arc thus separated from the poles was very free from continuous spectrum, and he was thus better able to study the spectrum lines than if a stationary arc were used. The arc was enclosed in a comparatively air-tight brass "hood," through which a stream of electrolytically-prepared hydrogen was continually passing. The light from the arc passes through a lens fixed at the end of a brass tube fitting into the wall of the hood. The arc spectra in hydrogen of aluminium, copper, magnesium, coin-silver, sodium, tin and zinc were examined both visually and photographically. Of the well-known series of hydrogen lines seen in its low-pressure spark spectrum and in the spectra of the hotter stars, $H\alpha$ and $H\beta$ are well shown visually in the case of all metals except Na; the majority also show $H\gamma$, but $H\delta$ is rarely seen. $H\alpha$ is sharp and well defined, the others broad and hazy. In the photographic spectra, $H\beta$ and $H\gamma$ are seen in the case of all metals except Na, while $H\delta$ shows in the spectra of tin, silver and copper. A small dispersion spectrum of tin shows $H\epsilon$ also. The weaker hydrogen lines more refrangible than $H\epsilon$ have not been traced, this being probably due to the inordinate width of the lines, those detected averaging about twenty-five tenth metres. All the metals except tin give a characteristic set of lines which do not occur in the arc spectrum in air of the corresponding metal. These new lines do not seem to bear any particular relation to the spark lines of the respective metals, and the author supposes them to be due to compounds of hydrogen with the metals formed in the arc. No new lines have been found which can with certainty be attributed to hydrogen. At the end of the paper an interesting discussion is given of the general effects of the hydrogen atmosphere on the arc and its spectrum.

THE first of the international balloon ascents for the current year took place on January 9. At Chalais-Meudon the ascent was at 8h. a.m.; temperature at starting 1°.C., maximum height reached 11,405 m., minimum temperature −63°·1. At Trappes two ascents were made; the heights reached were 15,000 m., temperature −61°·4, and 15,670 m., −62°·2. At Strassburg a height of 8100 m. was reached; temperature at starting −4°·4, minimum −42°·8. One of the manned balloons at Berlin remained up for nearly twenty-nine hours, and the following readings were taken:—at starting, 3°·9; at 3490 m., −4°·3; at 4850 m., −15°·1. While travelling eastward the same stratum of cloud was always observed, the upper edge of which continually increased in height. Above the cloud an inversion of temperature occurred and a sudden change of wind from west to about north-west. Three balloons ascended from Vienna; in one of the manned balloons a temperature of −10° was recorded at 4100 m. Ascents were also made from Pavlovsk (St. Petersburg) and Mr. Rotch's observatory, Blue Hill, in the United States. Except at St. Petersburg, the balloons ascended in an extensive area of high barometric pressure, the centre of which lay over the Alps.

IN *Symons's Meteorological Magazine* for February, a map is given showing the places, so far as at present ascertained, at which deposits of yellowish-pink dust were observed on January 22 and 23. It attracted attention over practically the whole of Cornwall, near the western border of Devon, and at a few points in Somerset, the south of Gloucester and Glamorgan.

Specimens of the dust have been microscopically examined by competent authorities, and it appears to be of the same nature as that which is often carried over from Africa to Europe. Further particulars are needed for the purpose of a more detailed account. Dr. H. R. Mill gives some particulars respecting the high barometer readings of January last. The highest pressure before recorded in the British Isles was 31·108 inches, at Ochtertyre, on January 9, 1896, but the reading at Aberdeen on January 31, namely 31·11 inches, as given in the *Daily Weather Report*, was apparently a trifle higher than the previous record. Dr. Mill directs attention to the fact that the popular belief that a high barometer involves calm weather was somewhat rudely shaken by the easterly gale which raged in the Channel from January 31 to February 2—under the influence of the low-pressure area in southern Europe.

THE September issue (vol. vi. art. 1) of the *Bulletin* of the Illinois State Laboratory contains the first part of a history of the dragon-flies of that State by Messrs. Needham and Hart. The authors state that these insects, together with their near relatives the May-flies, are the isolated remains of an extremely primitive group, the members of which have become specialised along certain lines.

WE have received from the author, Mr. F. Finn, a copy of an interesting paper on the cage-birds of Calcutta, which appeared in the *Ibis* for July last. The taste for keeping birds in confinement has been prevalent for centuries among the natives of India, although now somewhat on the decline, the author citing evidence to show than an Australian cockatoo was imported in the time of Jehangir. It is satisfactory to learn that, on the whole, the treatment of these cage-birds is good. The natives display especial capacity for keeping soft-billed insectivorous species in confinement; and as an instance of the interest taken in birds, the author mentions that when a living bird-of-paradise was for the first time received in Calcutta, the then Amir sent a special messenger all the way from Cabul to ascertain whether it was really the bird he knew so well by report.

IN the course of a description of a new "agricultural ant" of the genus Pogonomyrmex, published in the *American Naturalist* for February, Prof. W. M. Wheeler takes occasion to dispose, once and for all, of the myth that certain ants of this group sow and reap the so-called "ant-rice." If the nests of the species in question be observed at the proper season, it will be seen that the workers often carry out from the store-chamber grains of ant-rice which have sprouted to deposit them in a heap some distance off. These seeds frequently, of course, take root and grow, and since the ants feed mainly upon such grass-seed, it is no matter for surprise that "ant-rice" should predominate in the ring of vegetation surrounding the nest. To state, however, that the ant, "like a provident farmer, sows this cereal and guards and weeds it for the sake of garnering its grain is as absurd as to say that the cook is planting and maintaining an orchard when some of the peach-stones she has thrown into the yard chance to grow into peach-trees." The myth will, however, probably be hard to kill, since it is supported, not only by the authority of Darwin, but is repeated in Lord Avebury's well-known work on ants.

THE oviparous species of peripatus form the subject of a long article (illustrated with a coloured plate) by Dr. A. Dendy in the February number of the *Quarterly Journal of Microscopical Science*. The fact that an Australian species of peripatus (using this term in a general sense) lays eggs was announced by Dr. Dendy in NATURE of February 14, 1889; and although, largely owing to some confusion in the identification of species, the statement was received with considerable scepticism, the author has now been enabled, not only to fully demonstrate its truth, but to show that the phenomenon occurs in a second Australian species. It is certainly a very remarkable circumstance that while the other known species of these primitive arthropods are viviparous, these two forms (now designated Oöperipatus) should lay eggs; and it would be of the greatest interest could the reason for the departure from the general rule be accounted for. Dr. Dendy, after describing the anatomy of the egg-laying species in considerable detail, discusses the phylogeny of the whole group.

To the same journal Messrs. Bradford and Plimmer communicate an important paper on the organism infesting the blood of animals suffering from tsetse-disease. This parasite, for which the authors have proposed the name *Trypanosoma brucei*, is fully described and its life-history sketched. Many experiments have been made with the view of discovering whether any animals are immune against this parasite, but so far without success. The authors add, however, that there is probably in all animals some attempt at resistance to its attacks, and that this is effected by means of phagocytes. The parasite is closely allied to one affecting sewer-rats, which belongs to the same genus. The rat Trypanosoma does not, however, in the least protect the animal containing it against the tsetse parasite. It may be added that a beautiful series of greatly enlarged models illustrating the life-history of the latter is now exhibited in the Natural History Museum.

IN the last *Bollettino* of the Italian Seismological Society (vol. vii. No. 5), Dr. Cancani describes an interesting series of earthquakes felt during April and May, 1901, in the district round Palombara Sabina, near Rome, the strongest of which (on April 24) caused some damage to buildings. The focus of this earthquake being evidently at a very slight depth, Dr. Cancani ascribes the shocks to readjustments of the superficial strata due to the erosion of the underlying rock. From records obtained at Rome, Padua and Casamicciola, the mean velocity of the earth-waves was found to be 4·85 km. per second.

THE *Journal of Geography*, a new American monthly, succeeds the *Journal of School Geography* and the *Bulletin* of the American Bureau of Geography. The January number contains a paper on useful products of the century plants, by W. B. Marshall, and the first instalments of papers on field work in physical geography, by Prof. W. M. Davis, and on the trade and industries of western South America, by Emory R. Johnson. A special feature is "Geography Current," a series of notes and reviews on subjects bearing on various branches of geography.

THE *Journal* of the Society of Arts for February 14 contains a valuable paper by Commander R. Whitehouse, R.N., on the Uganda Railway and the survey of Lake Victoria Nyanza. On the opening of the whole line, the journey from Mombasa to Port Florence will take two and a half days, and the steamer journey from Port Florence to Mengo another day, as against seventy days by caravan. The railway has already opened up a large amount of country, and until other railways are constructed it must command the trade of the whole of that part of Central Africa.

THE Berlin Gesellschaft für Erdkunde begins the year with a change in the form of its publications. The *Zeitschrift* and the *Verhandlungen* are now combined in a single journal, which retains the name of the former, and is to appear ten times a year. The January number contains, among other things, papers by Herr O. Neumann, on a journey from the Somali coast through southern Ethiopia to the Soudan, by Herr K. Sapper, on the physical geography of Honduras, by MM. E. Reclus and Valère Maes, on the "disque globulaire" (the admirable maps on natural curvature produced recently under M. Reclus' direction), and a report by Dr. E. von Drygalski, dated Cape Town, on the progress of the German South Polar Expedition.

THE Queensland Geological Survey, under the direction of Mr. William H. Rands, has forwarded *Bulletins* Nos. 13 to 17 (1901). In these we have additional notes on the Cretaceous fossils of Queensland by Mr. Robert Etheridge, jun., and reports on mining districts by Mr. Rands and Mr. B. Dunstan. Referring to the Mount Morgan mine, Mr. Dunstan remarks that it is impossible to tell by appearances whether the stone is rich or poor, as of two samples which might be absolutely the same in texture, colour, structure, specific gravity and visible mineral constituents, one would perhaps yield as many ounces of gold to the ton as the other would pennyweights. In an account of Diglum Creek, in the Gladstone district, Mr. Dunstan describes the production of garnet, wollastonite, epidote and chert where granite has come in contact with limestone. We have also received folio reports on the Gympie gold field by Mr. Rands, and on the Hamilton, Coen and Jordan Creek gold fields by Mr. Lionel C. Ball. Permo-Carboniferous coal-bearing beds occur in the valleys of the Dawson and Mackenzie rivers, and outcrops of anthracitic coal have been traced by Mr. Dunstan. The Dawson coal, which is a ten-foot seam, is reported to be suitable for general purposes and as absolutely smokeless. In central Queensland there is an area of upwards of 5000 square miles which may be coal-bearing; hence a closer and more detailed examination of this region is desirable.

MESSRS. CASSELL AND CO. have commenced the publication, in fortnightly parts, of "Familiar Wild Flowers," by Mr. F. E. Hulme The complete work contains 280 coloured pictures, including 40 which have been specially prepared for the new edition, and will be completed in twenty-four parts at sixpence each.

MR. W. WESLEY, of Essex Street, Strand, sends us a "Catalogue of Zoological Literature" (No. 140, in two parts). As it includes the late Mr. S. P. Hanley's conchological library, as well as the entomological library of Mr. H. Christoph and the works on Cœlentera collected by the late Prof. G. J. Allmann, it is worth careful attention on the part of those interested in such subjects.

MORE than forty years after his first determinations of the transport numbers of the ions in the passage of electricity through solutions of electrolytes, W. Hittorf describes, in the *Zeitschrift für physikalische Chemie*, some interesting experiments relating to the influence, exercised by the diaphragms separating the anode and kathode solutions, on the measured values of these transport numbers. When a porous clay diaphragm is used, the volume of the solution at the anode decreases in all cases investigated. When, however, an animal membrane separates the anode and kathode solutions, it is found that with solutions of the chlorides of potassium, ammonium and sodium, cataphoresis takes place in the direction of the current, whilst with dissolved chlorides of the alkaline earth metals and of cadmium, the cataphoric effect is in the opposite direction. In the latter case, the volume of the solution at the anode increases. At the animal membrane, apparently a separation of the original solution into a solution more concentrated and one more dilute takes place. This behaviour of animal membranes results in considerable errors in the determination of transport numbers, and Hittorf is able to account for the deviations between the results obtained by himself in the late fifties and those more recently obtained by other investigators who have not made use of animal membranes in their experiments.

THE additions to the Zoological Society's Gardens during the past week include a Pluto Monkey (*Cercopithecus leucampyx*, ♂) from Uganda, a Leopard Tortoise (*Testudo pardalis*) from British East Africa, presented by Major C. Delmé Radcliffe a Vulpine Phalanger (*Trichosurus vulpecula*) from Australia, presented by Mr. T. W. Dye; three Bengal Red-vented Bulbuls (*Pycnonotus bengalensis*) from India, presented by Mr. Frank Finn; a Ludio Monkey (*Cercopithecus ludio*) from West Africa, two young Lions (*Felis leo*, ♂ ♀) from British East Africa, four Prjevalsky's Horses (*Equus prjevalski*, ♂ ♂, ♀ ♀) from Mongolia, a Red Lory (*Eos rubra*) from Moluccas, a Green Conure (*Conurus leucopthalmus*) from Trinidad, an Angulated Tortoise (*Testudo angulata*) from South Africa, deposited; an English Wild Cow (*Bos taurus*) born in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE SPECTRUM OF THE CHROMOSPHERE.—At the recent meeting of the Astronomical and Astrophysical Society of America, held at Washington, Mr. S. A. Mitchell read a paper on the observations made during the total solar eclipse in Sumatra on May 18, 1901. The spectrum photographs were obtained with an objective grating spectrograph; the grating had a ruled surface 3½ × 5 inches, with 15,000 lines to the inch, the objective being a quartz lens of a little more than 3¼ inches aperture and about 72 inches focal length. Light from the eclipsed sun was reflected into this instrument by a cœlostat. The adjustments were such as to ensure a "normal" spectrum, this being the case when grating and photographic plate were each perpendicular to the diffracted beam. The first order was employed, from λ 3000 to λ 6000. Although the sky was never clear during the period of totality of 5 min. 41 secs., eight exposures were made—one before and one just after totality for the cusp spectra, one at first and one at second flash, and four with varying exposures during the total phase. The second flash appeared fully exposed, and the plate has been carefully measured. The dispersion is such that from H_β to H_ϵ occupies a length of 95·4 mm., *i.e.* 1 tenth-metre corresponds to about 0·1 mm. In the region mentioned, H_β to H_ϵ, 363 lines have been determined. Of these, 269 have been identified with lines on Rowland's map.

Tables have been made of the ratios between the intensities of lines in this flash spectrum and in the ordinary Fraunhofer spectrum, and also of the ratios of the number of lines of each element identified to the whole number of solar lines for that metal. Both these sets of ratios appear to show systematic variation, and they are grouped into three classes, their behaviour being considered in conjunction with the atomic weights of the elements.

The variations in intensity are considered as chiefly due to the various heights to which the different metals ascend in the chromosphere. It is thought that the metals of group II. extend very high and are nowhere very condensed, and their flash lines will be true reversals of the corresponding solar lines. The metals of groups I. and III. are denser near the sun's surface and do not extend so high, and hence their flash lines are to be regarded as only partial reversals of the Fraunhofer lines. These facts lead the author to conclude with a renewal of faith in the existence of the "reversing layer."

PHOTOGRAPHIC DETERMINATION OF LONGITUDE.—In the *Comptes rendus*, vol. cxxxiv. pp. 387–389, M. G. Lippmann describes a new method for the photographic determination of longitude, using an apparatus originally designed by M. Fabry (*Bulletin Astronomique*, p. 148, 1895) for visual observation only. The arrangement was extended by M. Lippmann so as to permit of photographic registration, and described in *Comptes rendus*, cxxxiv. pp. 205–208. The principle of the method consists of making simultaneous records of the zenith at each station, the required longitude being the difference in right ascension observed. The apparatus is similar to that employed for nadir observations. Light from an adjustable horizontal collimator falls on a half-silvered mirror inclined at 45° to the vertical, and is reflected to the surface of a bath of mercury. After its reflection from the mercury, the light is again reflected from the mirror into the collimator, giving an image of the slit or cross-wires which may be adjusted to coincide with the source.